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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,901	09/27/2001	Qingwei Zhao	42390P11194	5669

			EXAMINER
8791	7590	11/10/2004	SKED, MATTHEW J

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ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is

closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All   b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage

application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date *12/27/01*.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

Double Patenting

1.   The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

      A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

      Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2.   Claims 1, 8, and 15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 5, 7, 9, 11, 13, 15, and 17 of copending Application No. 10/130,857 in view of Odell (U.S. Pat. 6,668,243). Specifically, claim 1 of the current application is rejected in view of claims 7, 9, and 11 of application 10/130,857, claim 8 of the current application is rejected in view of claims 1, 3, and 5 of application 10/130,857, and claim 15 of the current application is rejected in view of claims 13, 15, and 17 of application 10/130,857.

      Application 10/130,857 teaches a system, method and machine-readable medium comprising:

      a lexical tree having a plurality of nodes, wherein an input speech is processed by propagating tokens along a plurality of different paths within the

lexical tree (phonetic tree, claims, 1, 7, and 13), each token containing information relating to a probability score and a word path history (language model probability and new path history, claims 5, 11 and 17);

a buffer having a plurality of entries (generating tokens to remember path history implies that there would be a buffer or memory to remember this, claims 5, 11, and 17);

and a merging task to access a token list containing a group of tokens that have propagated to current state from a plurality of transition states (claims 3, 9, and 15).

Application 10/130,857 does not teach to place tokens into an appropriate entry in said buffer according to a hash value and to merge tokens with the same word path history to form a merged token list.

Odell teaches to place tokens into an appropriate entry in said buffer according to a hash value (predicted word identifier, col. 9, lines 30-34) and to merge tokens with the same word path history to form a merged token list (merge tokens with previous word history, col. 8, lines 10-14).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of application 10,130,857 to place tokens into an appropriate entry in said buffer according to a hash value and to merge tokens with the same word path history to form a merged token list as taught by Odell because hashing and merging tokens would save memory hence decreasing token search time.

This is a <u>provisional</u> obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35

U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1-5, 8-11, 15 and 16 are rejected under 35 U.S.C. 102(b) as being

clearly anticipated by Odell (PCT version was published 6/2/00).

As per claim 1, Odell teaches a system, method and machine-readable

medium comprising:

a lexical tree having a plurality of nodes (set of nodes with links, col. 5,

lines 10-12), wherein an input speech is processed by propagating tokens along

a plurality of different paths within the lexical tree (pass tokens from preceding

states into the current state, col. 8, lines 1-5), each token containing information

relating to a probability score and a word path history (acoustic score, language

model score, and pointers to previous words, col. 4, lines 50-54);

a buffer having a plurality of entries (hash table, col. 9, lines 30-34);

and a merging task (1) to access a token list containing a group of tokens

that have propagated to current state from a plurality of transition states (history

entries, col. 9, lines 19-21), (2) to place tokens into an appropriate entry in said

buffer according to a hash value (predicted word identifier, col. 9, lines 30-34)

and (3) to merge tokens with the same word path history to form a merged token list (merge tokens with previous word history, col. 8, lines 10-14).

5.   As per claim 2, Odell teaches a long-span M-gram language model integrated into the system (teaches using tri-phone models and later teaches how the invention reduces the complexity to allow for the use of N-gram models hence suggesting they are long-span, col. 3, lines 64-66 and col. 9, lines 8-10).

6.   As per claim 3, Odell teaches the long-span language model is a tri-gram based language model (tri-phone language model, col. 3, lines 64-66).

7.   As per claim 4, Odell teaches that M is greater than 3 (teaches using tri-phone models and later teaches how the invention reduces the complexity to allow for the use of N-gram models hence suggesting that N is greater than 3, col. 3, lines 64-66 and col. 9, lines 8-10).

8.   As per claim 5, Odell teaches that the hash value of a token is computed based on a word path history associated with said token (hashed on the history, col. 9, lines 30-34).

9.   As per claims 8 and 15, Odell teaches a method and machine readable apparatus comprising:

        passing tokens through a transition network (pass tokens from preceding states into the current state, col. 8, lines 1-5) configured to represent search paths for decoding an input speech (pointers to previous words, col. 4, lines 50-54);

        accessing a token list containing a group of tokens that have propagated to current state from a plurality of transition states (hash table, col. 9, lines 30-

34); , each token in the token list containing information relating to a word path

history and a probability score (acoustic score, language model score, and

pointers to previous words, col. 4, lines 50-54);

calculating a hash value for each token in said token list (all history entries

stored in the hash table so they must each have their own hash value, col. 9,

lines 30-34); and

merging tokens with same word path history according to said hash value

(merge tokens with previous word history, col. 8, lines 10-14).

10.   As per claim 9, Odell teaches a long-span M-gram language model

integrated into the system (teaches using tri-phone models and later teaches

how the invention reduces the complexity to allow for the use of N-gram models

hence suggesting they are long-span, col. 3, lines 64-66 and col. 9, lines 8-10).

11.   As per claim 10, Odell teaches the long-span language model is a tri-gram

based language model (tri-phone language model, col. 3, lines 64-66).

12.   As per claim 11 and 16, Odell teaches that the hash value of a token is

computed based on a word path history associated with said token (hashed on

the history, col. 9, lines 30-34).

Claim Rejections - 35 USC § 103

13.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which

said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14.   Claim 6, 7, 13, 14, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Odell in view of Main et al. (<u>Data Structures and Other Objects Using C++</u>).

As per claim 6, Odell does not specifically teach how the hash value is calculated from the word path history.

Main teaches different methods for calculating the hash value (different hash functions, page 583, second section).

Neither Odell nor Main teach hash value associated with a particular token is calculated as follows:

$$L = \alpha(1)W(1) + \alpha(2)W(2-) + \alpha(3)W(3)$$

where $W(1)$ represents a word index number associated with the first word in the word path history; $W(2)$ represents a word index number associated with the second word in the word path history; $W(3)$ represents a word index number associated with the third word in the word path history; and $\alpha(1)$, . $\alpha(2)$, $\alpha(3)$ are individually assigned to a constant number.

However, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Odell and Main to calculate the hash value through the given method because the applicant does not show how this method is an improvement upon the prior art. The hash value is simply a value used to index and reference data and as long as the same method of calculation is used throughout then the methods used would work equally well.

15.   As per claim 7, 13, and 18, Odell does not teach that the merging task calculates a new hash value for a token in the event the buffer entry associated with the previous hash value contains another token with different word path history.

Main teaches calculating a new hash value for a token in the event the buffer entry associated with the previous hash value contains another token with different word path history (double hashing, page 584, third paragraph).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Odell to calculate a new hash value for a token in the event the buffer entry associated with the previous hash value contains another token with different word path history as taught by Main because, as Main teaches, it would avoid clustering (page 584, second paragraph).

16.   As per claims 14 and 19, Odell does not teach the new hash value is computed based on a collision principle to ensure that a subsequent token with the same word path history will go through the hash table in a proper order and be assigned to the same new index number.

Main teaches the new hash value is computed based on a collision principle to ensure that a subsequent token with the same word path history will go through the hash table in a proper order and be assigned to the same new index number (double hashing uses a second hash calculation to determine how close in the table to move the new entry away from the original entry hence based upon the collision principle, page 584, third paragraph).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Odell so that the new hash value is computed based on a collision principle to ensure that a subsequent token with the same word path history will go through the hash table in a proper order and be assigned to the same new index number as taught by Main because, as Main teaches, redesigning the hash function such that there would be no collisions could not be done hence this method will avoid collisions and keep the tokens in the proper order (page 571, paragraph 4).

17.   Claims 12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Odell in view of Robinson (U.S. Pat. 5,983,180).

Odell teaches that merging the tokens comprises:

placing tokens into an appropriate entry in a buffer according to said hash value (sorted according to predicted word identifier, col. 9, lines 30-34); and

if the entry in the buffer associated with said hash value is occupied, determining if a word path history associated with the token residing therein matches a word path history associated with a current token (merge tokens that share the same previous word history, col. 8, lines 10-14).

Odell does not teach during merging, retaining one of the tokens with the higher probability score and discarding the other token.

Robinson teaches a system that during merging of the tokens retains the token with the better-calculated probability (col. 14, lines 51-54).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the system of Odell that during merging, retaining one of the

tokens with the higher probability score and discarding the other token as taught

by Robinson because keeping the tokens with better probabilities would give

better recognition results.

Conclusion

18.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Alshawi (U.S. Pat. 5,870,706), Ho et al. (U.S. Pat.

6,571,240), and Cohen (U.S. Pat. 6,311,183) teach systems that search trees for

information and save the tokens in a hash table.

Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Matthew J Sked whose telephone number is

(703) 305-8663. The examiner can normally be reached on Mon-Fri (8:00 am -

4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the

examiner's supervisor, Talivaldis Smits can be reached on (703) 306-3011. The

fax phone number for the organization where this application or proceeding is

assigned is 703-872-9306.

Information regarding the status of an application may be obtained from

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system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-

free).

MS
11/04/04

SUSAN MCFADDEN
PRIMARY EXAMINER